Amendments to the Claims

This listing of claims will replace all prior versions and listings of claims in the application.

Listing of Claims

1-28. (Canceled)

29. (Currently Amended) A method of forming a fuel cell, comprising the steps of:

providing a first electrode layer having a first surface and a second opposing surface, wherein at least a portion of the first surface is conductive;

forming a first aperture defined by a first aperture surface through ~~a~~ the first electrode layer;

providing a second electrode layer having a first surface and a second opposing surface, wherein at least a portion of the first surface is conductive;

forming a second aperture defined by a second aperture surface through ~~a~~ the second electrode layer;

providing a proton exchange membrane having a first surface and a second opposing surface;

providing an adhesive between the first electrode layer and the proton exchange membrane and between the second electrode layer and the proton exchange membrane;

~~providing a conductive layer on the first electrode layer and/or a conductive layer on the second electrode layer, wherein the conductive layer on the first electrode layer covers at least part of the first aperture surface; and~~

sandwiching the proton exchange membrane and the adhesive between the first electrode layer and the second electrode layer with the first and second apertures substantially free of the adhesive, where the first aperture of the first electrode layer is at least partially aligned with the second aperture of the second electrode layer, thereby exposing the proton exchange membrane, wherein the second surface of the first electrode layer is proximate the first surface of the proton

exchange membrane and the first surface of the second electrode layer is proximate the second surface of the proton exchange membrane;

providing an electrical connection between at least a portion of the first surface that is conductive of the first electrode layer and the proton exchange membrane; and

providing an electrical connection between at least a portion of the first surface that is conductive of the second electrode layer and the proton exchange membrane.

30. (Previously Presented) A method according to claim 29 wherein the proton exchange membrane includes a catalyst.

31. (Previously Presented) A method according to claim 30 wherein the proton exchange membrane includes a perfluorosulfuric acid membrane with a polytetrafluoroethylene backbone.

32. (Currently Amended) A method according to claim ~~31~~ 30 wherein the catalyst includes carbon/platinum.

33. (Currently Amended) A method according to claim 29 wherein at least a portion of the second surface of the first electrode layer is conductive and in electrical contact with a conductive portion of the first surface of the first electrode layer.

34. (Currently Amended) A method according to claim ~~33~~ 29 wherein at least a portion of the second surface of the second electrode layer is conductive and in electrical contact with a conductive portion of the first surface of the second electrode layer.

35. (Canceled)

36. (Currently Amended) A method according to claim 29, wherein the step of providing the first ~~a conductive~~ electrode layer includes providing a ~~the~~ conductive layer on at least a portion of the first surface of the first electrode layer ~~and/or at least a portion of the second electrode layer after the aperture forming steps~~.

37. (Currently Amended) A method according to claim 36 ~~29~~, wherein the first electrode layer is ~~step of providing conductive layer includes providing the conductive layer on the first electrode layer and/or the second electrode layer, wherein the first and second electrode layers are~~ substantially non-conductive prior to providing the conductive layer.

38. (Canceled)

39. (Currently Amended) A method according to claim 37 wherein the conductive layer ~~on the second electrode layer~~ covers at least part of the first ~~second~~ aperture surface.

40. (Currently Amended) A method according to claim 37 wherein the conductive layer on the first electrode layer extends from the first surface of the first electrode layer to the second surface of the first electrode layer along the first aperture surface of the first aperture ~~through the first electrode layer~~.

41. (Currently Amended) A method according to claim ~~40~~ 29 wherein the step of providing the second electrode layer includes providing a conductive layer on at least a portion of the first surface of the second electrode layer, and wherein the conductive layer on the second electrode layer extends from the first surface of the second electrode layer to the second surface of the second electrode layer along the second aperture surface of the second aperture ~~through the second electrode layer~~.

42. (Previously Presented) A method according to claim 29 wherein the first electrode layer is conductive.

43. (Currently Amended) A method according to claim ~~42~~ 29 wherein the second electrode layer is conductive.

44. (Currently Amended) A method according to claim 29 wherein the first electrode layer is substantially non-conductive, and includes one or more conductive [feed-]through contacts.

45. (Currently Amended) A method according to claim ~~44~~ 29 wherein the second electrode layer is substantially non-conductive, and includes one or more conductive [feed-]through contacts.

46. (Previously Presented) A method according to claim 29 wherein the adhesive is conductive.

47. (Currently Amended) A fuel cell comprising:

a first electrode comprising:

a first electrode top surface;

a first electrode bottom surface;

a first electrode thickness defined by a first distance between the first electrode top surface and the first electrode bottom surface;

a first electrode aperture through the first electrode thickness defined by a first electrode aperture surface;

a second electrode comprising:

a second electrode top surface;

a second electrode bottom surface;

a second electrode thickness defined by a second distance between the second electrode top surface and the second electrode bottom surface;

a second electrode aperture through the second electrode thickness defined by a second electrode aperture surface;

a first conductive layer ~~disposed on~~ including at least a portion of the first electrode top surface, at least a portion of the first electrode bottom surface, and one or more of at least a portion of the first electrode aperture surface and a through contact, wherein the first conductive layer on the one or more of the at least a portion of the first electrode aperture surface and the

through contact provides an electrical connection between the first conductive layer on the first electrode top surface and the first conductive layer on the first electrode bottom surface;

a second conductive layer ~~disposed on~~ including at least a portion of the second electrode top surface~~, at least a portion of the second electrode bottom surface, and at least a portion of the second electrode aperture surface~~;

a proton exchange membrane in electrical contact with and disposed between the first conductive layer and the second conductive layer;

wherein, the first electrode aperture is at least partially aligned with the second electrode aperture, thereby exposing the proton exchange membrane.

48. (Previously Presented) The fuel cell according to claim 47, wherein the proton exchange membrane includes a top catalyst layer and a bottom catalyst layer.

49. (Previously Presented) The fuel cell according to claim 47, wherein the proton exchange membrane has a thickness of 1 mil or less.

50. (Previously Presented) The fuel cell according to claim 47, wherein the first aperture surface defines a first aperture cross-sectional surface area of 1 mm^2 or less.

51. (Previously Presented) The fuel cell according to claim 47, wherein the first conductive layer has a thickness of 1000Å or less.

52. (Previously Presented) The fuel cell according to claim 47, wherein the second conductive layer having a thickness of 1000Å or less.

53. (Previously Presented) The fuel cell according to claim 47, wherein the first electrode thickness and the second electrode thickness are 2 mil or less.

54. (Currently Amended) A method of forming a plurality of fuel cells, comprising the steps of:

providing a first length of material having a first plurality of apertures therethrough and a first plurality of electrical contacts, wherein the first plurality of electrical contacts include one or more conductive ~~feed-~~through contacts that extend through the first length of material;

providing a second length of material having a second plurality of apertures therethrough ~~and a second plurality of electrical contacts~~;

providing a proton exchange membrane;

~~providing an adhesive layer between the proton exchange membrane and the first length of material, between the proton exchange membrane and the second length of material, or between the proton exchange membrane and the first and second length of material; and~~

~~sandwiching~~ laminating the proton exchange membrane ~~and the adhesive~~ between the first length of material and the second length of material, where the first plurality of apertures are at least partially in registration with the second plurality of apertures, and wherein at least part of the proton exchange membrane is aligned with the plurality of first and second apertures to form a plurality of fuel cells; and

wherein the laminating step causes a plurality of electrically conductive connections between the proton exchange membrane and the first plurality of electrical contacts via the one or more conductive through contacts that extend through the first length of material.

55. (Currently Amended) A method according to claim 54, further comprising the step of dicing at least some of the plurality of fuel cells into single fuel cells.

56. (Currently Amended) A method according to claim 54 wherein the first plurality of electrical contacts include ~~are positioned on~~ a surface of the first length of material that is facing away from the proton exchange membrane.

57. (Canceled)

58. (Currently Amended) A method according to claim ~~56~~ 59 wherein the second plurality of electrical contacts are positioned on a surface of the second length of material that is facing away from the proton exchange membrane.

59. (Currently Amended) A method according to claim 58 further comprising providing a second plurality of electrical contacts on the second length of material, wherein the second plurality of electrical contacts include one or more conductive ~~feed~~-through contacts that extend through the second length of material.

60. (Currently Amended) A method according to claim 54 wherein the laminating step includes providing an adhesive layer between the proton exchange membrane and the first length of material, between the proton exchange membrane and the second length of material, or between the proton exchange membrane and the first and second length of material, and wherein the adhesive is conductive.

61. (New) A method of forming a plurality of fuel cells, comprising:

providing a first length of material having a first plurality of apertures therethrough and a first plurality of electrical contacts therethrough;

providing a second length of material having a second plurality of apertures therethrough and at least a second electrical contact;

providing a proton exchange membrane;

passing the first length of material, the proton exchange membrane, and the second length of material through a joining unit, wherein the proton exchange membrane is between the first length of material and the second length of material, the first plurality of apertures and the second plurality of apertures are at least partially aligned thereby exposing the proton exchange membrane therebetween, and the proton exchange membrane is in electrical contact with the first plurality of electrical contacts and the second electrical contact; and

laminating the first length of material, the proton exchange membrane, and the second length of material as they pass through the joining unit.

62. (New) A method according to claim 61, wherein the proton exchange membrane includes a top catalyst layer and a bottom catalyst layer.

63. (New) A method according to claim 61, wherein the second electrical contact of the second length of material comprises a plurality of electrical contacts.

64. (New) A method according to claim 61, wherein the laminating step includes interposing an adhesive between the proton exchange membrane and at least one of the first length of material and the second length of material.

65. (New) A method according to claim 64, wherein the adhesive is conductive.

66. (New) The fuel cell according to claim 47 further comprising a fuel reservoir in fluid communication with the proton exchange membrane.